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SUBSTITUTE SPECIFICATION

Our Reference: RUN-112-B PATENT

PHASED ARRAY ANTENNA WITH EXTENDED RESONANCE POWER DIVIDER/PHASE SHIFTER CIRCUIT

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of U.S. Provisional Patent Application Ser. No. 60/472,607 filed May 22, 2003, which is incorporated by reference herein in it's entirety.

FIELD OF THE INVENTION

[0002] The present invention relates to an extended resonance based phased array system for reducing and/or eliminating the need of a separate power splitter and phase shifters in a conventional phased array system, which results in a very compact and simple circuit structure at lower-cost.

BACKGROUND OF THE INVENTION

[0003] A phased array is a group of antennas in which the relative phases of the respective signals feeding the antennas are varied in such a way that the effective radiation pattern of the array is reinforced in a desired direction and suppressed in undesired directions. Phased arrays are extensively used in satellite communications, multipoint communications, radar systems, early warning and missile defense systems, etc., so they are employed in large quantities. The cost of phased arrays can range from US $150,000 (500 antennas) to US $1,000,000 (3000 antennas). In a conventional phased array system, the signal to be sent is divided into many branches using a power splitter and each branch is then fed into a phase shifter (i.e. a phase shifter is a microwave component, which is used to delay the phase or timing of a sinusoidal signal) and followed by an antenna. The cost of a conventional phased array mainly depends on the cost of the phase shifters used. It has been estimated that almost half of the cost of a phased array is due to the cost of phase shifters. Because of the high cost of phase shifters, a significant amount of research has been performed to minimize the cost and improve the performance of phase shifters. In addition, conventional phased arrays result in very complex structures and suffer from high loss and mass.